ANSWER KEY - Student work

Card A	**Card B**
Perimeter = 11 + 11 + 3 + 3 + $\frac{1}{4}C$ Perimeter = 28 + 0.25(3.14)(16) ≈ 28 + 12.56 Perimeter ≈ 40.56 cm Area = Area of Square + $\frac{1}{4}$(Area of Circle) Area = (11 × 11) - $\frac{1}{4}$(3.14)(8)^2 Area ≈ 121 - 50.24 Area ≈ 70.76 cm^2	Perimeter = Circumference + 4(r) = 14π + 28 Radius must be 7 cm Area = Area of center square + Area of Circle Area = (7 × 7) + (3.14)(7)^2 Area ≈ 49 + 153.86 Area ≈ 202.86 cm^2
Card C	**Card D**
The diameter of one circle, *d* = 9 cm so: Perimeter = 27 + 9 + 9 + (3)$\left(\frac{1}{2}\right)C$ Perimeter = 45 + 1.5(3.14)(9) Perimeter ≈ 45 + 42.39 Perimeter ≈ 87.39 cm Area = Area of Rectangle − 3(Area of semi-circle) Area = (9 × 27) − (3)$\left(\frac{1}{2}\right)$(3.14)(4.5)^2 Area ≈ 243 − 95.38 Area ≈ 147.62 cm^2	Area = Area of large yellow semi-circle − Area of smaller semi-circle Large circle area ≈ $\left(\frac{1}{2}\right)$(3.14)(8)^2 ≈ 100.8 Small circle area ≈ $\left(\frac{1}{2}\right)$(3.14)(5)^2 ≈ 39.25 Area ≈ 100.8 − 39.25 Area ≈ 61.55 in^2

Card E

Circle 1: r = 1cm, A = 1π cm^2
Circle 2: r = 2cm, A = 4π cm^2
Circle 3: r = 3cm, A = 9π cm^2
Circle 4: r = 4cm, A = 16π cm^2
Circle 5: r = 5cm, A = 25π cm^2

Green area = Circle 5 − Circle 4 + Circle 3 − Circle 2 + Circle 1 = $(25 - 16 + 9 - 4 + 1)\pi$
Green area = 15π cm^2
Percent of design that is green is $\frac{15\pi}{25\pi} = 0.6$
60% of the design is green.
This seems reasonable since more than half is green.

Card F

Green area
Since the diameter of the yellow circle is 18, then the diameter of each small circle is 6. The circumscribed square around one small circle must have a side length of 6 too.
Area of square = $6^2 = 36$
Area of small circle = $\pi(3)^2 \approx 28.26$
Four corners ≈ 36 − 28.26 ≈ 7.74
The green section is composed of four corners (around two separate circles)
The area of the green portion is about 7.74 in^2.

Purple area
If the purple rectangle were whole, the area would be: 12 × 18 = 216
Area of 6 small circles: 6 × (28.26) = 169.56
216 - 169.56 = 46.44
I also have to take away the green section, which I already found above (7.74)
46.44 - 7.74 = 38.7
The area of the purple portion is about 38.7 in^2.

Card G

I see a square in the center of the circle, made up of all four diameters. Then I see 4 half-circles around it. I can find the area of the big circle, and subtract the area of the square and two full circles to find the remaining area, shaded blue.
Diameter of large circle = 70 in.
Diameter of one small circle = radius of large circle = 35 in.
Radius of one small circle = 17.5 in.
Side of square = 35 in.
Area of large circle ≈ $(3.14)(35)^2 \approx 3846.5$
Area of square = $35^2 = 1225$
Area of two small circles ≈ $2(3.14)(17.5)^2 \approx 1923.25$
Remaining area = 3846.5 − 1225 − 1923.25 = 698.25
The area of the blue shaded portion is about 698.25 in^2.

Card H

The diameter of the large circle is 3 times the diameter of the small circle, or 3 × 10 = 30 cm.
So the radius is 15cm.
A ≈ $(3.14)(15)^2 \approx 706.5$
The area of the large circle is about 706.5cm^2
To find the area of the shaded part, first, I will subtract the area of the 7 small circles from the large circle.
Area = $\pi(5)^2 = 25\pi \approx 78.5$
Area of all 7 circles: 7 × 78.5 ≈ 549.5
Area around the circles: 706.5 − 549.5 = 157
There are 6 "copies" of the shaded area within the large circle, so dividing 157 by 6, I get 26.17.
The area of the shaded region is about 26.17cm^2.